DOCUMENT RESUME

ED 244 237 CS 007 633

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TITLE Gifted Readers: Comprehension Strategies and Metacognition.
PUB DATE [82]
NOTE 39p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academically Gifted; Academic Aptitude; Age Differences; *Cognitive Processes; Comparative Analysis; Elementary Secondary Education; *Metacognition; *Reading Comprehension; Reading Processes; *Reading Research; *Reading Strategies

ABSTRACT

A study investigated the reading comprehension processes of gifted readers, specifically their use of comprehension strategies and their metacognitive awareness. Grade level differences in strategy use and metacognitive awareness were also examined. A standardized reading test and a metacognition questionnaire were administered to 100 gifted students in grades 4, 5, 6, and 7. Twenty students, five from each grade, were selected from this group to participate in protocol analysis and interviews. The results indicated that gifted readers used specific reading and reasoning strategies in the comprehension process. Gifted readers were also metacognitively aware of the strategies available to them, of ways to select and use the strategies, and of the effectiveness of the strategies they applied. Grade level differences in strategy use and metacognitive awareness were minimal. (Appendixes contain examples from the protocol analyses and a list of interview questions and responses.) (FL)

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Gifted Readers:
Comprehension Strategies and Metacognition

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Abstract

Gifted Readers: Comprehension Strategies and Metacognition

The reading comprehension process of the gifted reader was the focus of this research. The gifted reader's use and selection of comprehension strategies and metacognitive awareness were selected for study. Grade level differences in strategy use and metacognitive awareness were also investigated.

Two research tools, a standardized test and a questionnaire, were administered to 100 gifted students in grades 4, 5, 6, and 7. Twenty gifted readers, 5 from each grade, were selected from the 100 to participate in two research procedures, protocol analysis and interview.

The results of this study indicated that gifted readers use specific reading and reasoning strategies in the comprehension process. Gifted readers were metacognitively aware of strategies available, selection among and application of strategies, and effectiveness of strategies applied. Grade level differences in strategy use and metacognitive awareness were minimal.

GIFTED READERS: COMPREHENSION STRATEGIES AND METACOGNITION

Research Focus

Gifted readers are those gifted students who have been identified as successful comprehenders. These students' scores on reading comprehension tests are two or more grade levels above their chronological grade level peers (Deffenbaugh, 1976; Olshavsky, 1976-77; Terman, 1954; Trezise, 1977; Witty, 1971). In this measurement process, reading comprehension is viewed as a product. Reading comprehension as a product results from a dynamic, interactive process involving the reader and the printed message.

The successful reader is perceived as actively contributing to and controlling the reading process as comprehension is achieved. The reader contributes to the printed message as it is interpreted and altered in accordance with prior knowledge about the topic (Pearson & Johnson, 1978). The reader controls the process by clarifying purposes for reading, focusing on major content, monitoring comprehension success, self-questioning to assess comprehension, and taking corrective action as necessary (Brown, 1982). The focus of this research study is the gifted reader's use and control of the process of reading comprehension.

Gifted readers have available to them strategies or behavioral patterns of reading which enable them to attain comprehension. Specific strategies have been identified as used by good readers in the process of attaining comprehension (Kavale & Schreiner, 1979; Olshavsky,

1976-77). The following strategies are examples of those identified: word-related strategies such as use of context, synonym substitution, or stated failure to understand a word; clause-related strategies such as rereading, addition of information, or hypothesis; indirect text-related strategies such as personal identification, imagery, or generalization to own experience.

Gifted readers successfully control and use the reading process in order to attain the goal of comprehension. This cognitive control or monitoring of the comprehension process, inclusive of the selection and use of strategies, is called metacognition (Alvermann & Ratekin, 1982; Brown, 1977; Johnson, 1981). Gifted readers appear to monitor the comprehension process. They select and employ the appropriate strategy as needed in order to understand the meaning of the passage.

Since gifted readers are successful comprehenders and indicate a degree of metacognitive control, questions emerge about <u>how</u> they read for comprehension. This study is concerned with the investigation of the reading comprehension process employed by gifted readers. The general question asks how do gifted readers comprehend and what processes are involved? In order to answer the general question, specific questions about the reading process must be asked: what type of comprehension strategies are used by gifted readers? Are gifted readers aware of selection and use of comprehension strategies (metacognition)? Are there differences in awareness, use, and selection of cognitive strategies among gifted students in grades 4, 5, 6, and 7? These were the research questions which became the focus for this

study.

Methodology

The methodology employed in this research allowed for measurement of reading comprehension (product) and for identification of reading behaviors (process). Current reading research illustrates a broad, integrated perspective of the complexity of skills, behavior, strategies, and knowledge sources that comprise the reading process. Reading research methodology reflects this emphasis upon reading as an integrated, interactive process. Traditionally, reading has been examined by experimental, statistical methods as in projects employing experimental and control groups or in correlational studies. In the past decade, however, ethnographic methods have been applied to the study of reading as with projects using participant observation, protocol analysis, and interview procedures (Kavale & Schreiner, 1979; Olshavsky, 1976-77; Smith, 1982). Currently, reading researchers are combining the traditional and ethnographic approaches to the study of reading. The combination of traditional and ethnographic research procedures affords (a) the quantification of identified skills, behavior and levels of performance, essentially, the "outcomes" of the reading process, and (b) the qualification of the behavior strategies and relationships, essentially, the "process" of the reading. Traditional methods establish that the reading process works by measuring the outcome of applied knowledge, ethnographic methods investigate how one learns to learn (Applebee, 1981; Knott, in press(a); Knott, in press

(b); Rosenthal & Rosnow, 1969; Smith, 1982; Strang, 1962; Wilson, 1977).

Ethnographic methods, in combination with traditional methods, allow the researcher to explore both the reading outcome and the process. Reading, when viewed from both perspectives, can be seen as a complex and dynamic process. The combination of research techniques provides a more complete understanding of the complexity of the cognitive processes involved.

Traditional Research Techniques in the Present Study

The Iowa Tests of Basic Skills Reading Comprehension subtest, Levels 11 and 13, Form B (ITBS), a standardized instrument, was used in this study. The ITBS was applied (a) to measure the "outcomes" of reading for all 100 participants, (b) to assess specific variables of the complex process, for example, reading comprehension level and the response pattern to each of three question types (fact, inference, generalization), and (c) to establish the basis for selection of 20 students for participation in the protocol analysis and interview segments.

The metacognition questionnaire[1] was used to provide individual and group measures in response to questions about the use of reading and reasoning strategies and to establish individual awareness of the use of strategies. The questionnaire was developed in two parts. The first 43 questions required the respondent to assess awareness of the use of 11 reading strategies. The second section, having 27 questions, required

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[1]The metacognition questionnaire used in this research is included in the appendix of the copyrighted dissertation on file with University Microfilms International, 300 North Zeel Rd., Ann Arbor, Michigan 48106.

the respondent to assess awareness of 14 reasoning strategies. Some examples of questions appearing on the questionnaire follow:

1. Comparing the information in the reading passages to my experiences, thoughts, and feelings makes the passage easier to read. (personal identification)
2. When I find a new word, I use the information in the sentences surrounding the word to find out what the new word means. (use of context)
3. If I realize that I have not understood what I have been reading, I go back to where I last understood and start reading again. (rereading)
4. When I read the question, I look for certain important words that appeared in the reading passage to help select the best answer choice. (discourse-dependent—key lexical item)
5. My selection of an answer depends upon fitting key words in the question with key words in the answer. (choice-dependent—key lexical item)

These questions provoked students' awareness of their reading behaviors. This awareness, then, allowed for follow-up and discussion of strategies during the protocol analysis and interview segments.

Ethnographic Techniques in the Present Study

Twenty students were selected for participation in protocol analysis and interview. These students were selected from the 100 students based on the ITBS and questionnaire results.

The protocol analysis procedure allows for observation of the gifted reader applying the reading process in a "real" situation. The tape of each protocol analysis was examined to identify, from the subject's description, those protocols or strategies employed in the reading process. The protocol analysis enabled the researcher to see the reading process in action, allowed for close exploration of methods

employed to process print, and provided the opportunity to observe and analyze the process while it was being applied.

The interview continued the assessment of the reading process from the participant's perspective. The subject's consciousness of reading behaviors had been raised by responding to the questionnaire concerning reading and reasoning behaviors and by discussing reading as process in the protocol analysis. The interview provided the researcher and the subject with the format for joint discussion and analysis of the individual method of processing print.

The combination of traditional and ethnographic methods allowed the researcher to develop a profile of the gifted reader. This profile emerged from the traditional analysis of the Iowa Tests of Basic Skills, Reading Comprehension subtest and the metacognition questionnaire results combined with the ethnographic analysis of the protocol analysis and interview results.

Subjects

The subjects were gifted students participating in a local school's gifted program. Criteria for acceptance into this program includes: ranking in top 3% to 5% on a general achievement test (ITBS) and/or mental measurement (Otis Lennon), demonstrating consistently high classroom achievement in relation to students in the same age group, and measuring reading ability two or more grade levels above chronological grade placement. These identification and selection procedures are consistent with and supported by research into the identification of

gifted students (Clark, 1979).

All 155 students in the gifted program in grades 4, 5, 6, and 7 were invited to participate in this research project. Only 100 subjects returned the parent/student permission forms. The even division by sex in both the ITBS/questionnaire segment (50 boys, 50 girls) and the protocol analysis/interview segment (10 boys, 10 girls) was purely accidental. No attempt by this researcher was made to select equal numbers of boys and girls. The selection of the 20 participants in the protocol analysis and interview segment was based entirely on ITBS and questionnaire results.

Gifted Readers: The Comprehension Process

An indepth profile of the gifted reader was obtained through traditional and ethnographic research techniques. The information via the traditional techniques of standardized testing (ITBS) and the questionnaire affirmed the gifted reader's advanced reading ability, the use of comprehension strategies, and the exercise of metacognitive control over the reading comprehension process. The ethnographic techniques, however, revealed the process employed, the comprehension strategies applied, the monitoring of comprehension, and the exercising of control over the process as this comprehension process is activated.

The ITBS Reading Comprehension Subtest

The ITBS Reading Comprehension subtest was given to 100 gifted readers as a way to confirm their advanced level of reading

comprehension. According to various studies, good readers will score on a reading comprehension test two or more grade levels above chronological grade placement (Farr, 1973; Kavale & Schreiner, 1979; Olshavsky, 1976-77). It was expected that these 100 gifted students, identified as gifted by the school system, would score at least two grades above chronological grade placement.

The results of the ITBS Reading Comprehension subtest indicated that these 100 gifted students were advanced readers. On both levels of the test, the highest scoring students in each grade scored well above the two grade level criteria. The top grade equivalents on the level 11 test were not as high as on level 13 as the overall ceiling for level 11 was lower. However, the lowest scoring students in each grade scored better on level 11 than on level 13. Perhaps the increased difficulty of vocabulary and concepts on level 13 reduced the scores somewhat for these students. All students in this group scored at least one grade level above grade placement. The highest scoring group of students, from which protocol analysis subjects were selected, scored five to six grade levels above grade placement. According to previously stated criteria, these top scoring students are appropriately called gifted readers.

An additional result of the ITBS Reading Comprehension subtest was an analysis of the response patterns per grade level to three identified question types: fact, inference, generalization (Hieronymus, 1979). Grade level responses in each question category were examined to determine if there was a grade level difference in response. The

responses within categories were submitted to a one-way analysis of variance (ANOVA) to find significant differences. The Scheffe test was applied to determine which grade levels were significantly different at the .05 level.

The results of the one-way analysis of variance (ANOVA) for factual question responses for grades 4, 5, 6, and 7 show that a significant difference between grades does exist for factual question responses (F = 20.34, df = 3/95, $p < .05$). However, the ANOVA does not provide enough information to determine between which grades there is a significant difference. The Scheffe test was applied to these data to determine the means between which significant differences existed. It was found that the response pattern for grade 4 was significantly different at the .05 level in correct responses to factual questions from grades 5, 6, and 7. The response pattern for grade 5 also differed significantly at the .05 level from grades 6 and 7 (grade 4, M = 25.20; grade 5, M = 28.52; grade 6, M = 31.18; grade 7, M = 32.80).

The results of the ANOVA for inference question responses for grades 4, 5, 6, and 7 show that a significant difference between grades does exist (F = 18.02, df = 3/95, $p < .05$). The Scheffe test was applied to these data to determine the means between which significant differences existed. It was found that the response pattern for grade 4 is significantly different from grades 5, 6, and 7. The response pattern for grade 5 is significantly different from grade 7 (grade 4, M = 17.28; grade 5, M = 20.00; grade 6, M = 21.75; grade 7, M = 22.27; $p < .05$).

The results of the ANOVA for generalization question responses for grades 4, 5, 6, and 7 show that a significant difference between grades does exist ($F = 24.55$, $df = 3/95$, $p < .05$). The Scheffe test was applied to these data to determine the means between which significant differences existed. It was found that the response pattern for grade 4 is significantly different from grades 5, 6, and 7. The response pattern for grade 5 is significantly different from grades 6 and 7 (grade 4, $M = 20.28$; grade 5, $M = 23.52$; grade 6, $M = 26.82$; grade 7, $M = 27.33$; $p < .05$).

The statistical analysis of the response pattern within question categories indicated that learning to handle fact, inference, and generalization questions on a reading comprehension test involves skills developed as the child progresses through the grades. The response pattern or the difference in responses to the question types may be related to a number of sources: test-taking experience, background knowledge as related to text, experience with the question categories, etc. The results of this analysis do not indicate causality, only that a significant difference exists (Strang, 1962).

Metacognition Questionnaire

The metacognition questionnaire was given to the same 100 gifted students who took the ITBS Reading Comprehension subtest. The questionnaire was developed to include questions reflective of specific reading and reasoning strategies. Olshavsky defines a reading strategy as "a purposeful means of comprehending the author's message" (1976-77,

p. 656). For this study, reading strategies are those recurrent patterns of behavior employed to reach the goal of comprehension. Kavale and Schreiner define reasoning strategies as purposeful means of selecting responses to standardized measures of reading comprehension (1979, p. 106). For this study, reasoning strategies are those recurrent patterns of behavior employed to select the response on a multiple choice test.

The metacognitive questionnaire results indicate an awareness of strategies, use of strategies, and a distinction among those strategies which seem to be most effective. Five reading strategies received a rating of "high frequency" use: stated failure to understand a clause, rereading, use of information about the story, use of context, and remembering main ideas and details. Stated failure to understand a clause was the strategy which received the highest indication of use. As stated, "I know when I am not understanding when I am reading," this strategy is the key for metacognitive control of the reading process. Recognition of comprehension failure is the first step in controlling strategy use. Rereading seems the most common method of attempting to regain control of the reading process. Use of information about the story suggests the interactive aspect of reading as the student reads, retains, and applies what has been read previously to what is being read: reading is a cumulative process. Use of context appears to be the most frequently used method for identifying unknown words.

Two reading strategies were indicated as used "frequently": personal identification and hypothesis. These two strategies reflect

the interactive definition of reading as the individual relates personal experience to that which is described in the text or hypothesizes about what will follow based on previously read material or personal knowledge and experience.

Four reading strategies were rated as used "sometimes": inference, which reflects a "reading between the lines" interpretation of text; stated failure to understand a word, which essentially asked if many unknown words were encountered; synonym substitution, which referred to the use of known words for unknown words; and addition of information, which asked the student if known information was added to the information provided by the text. Though the reading strategies were rated differently in terms of usage, no reading strategy was unused. All of these strategies seem to be available as needed within the reading process of these students.

Gifted readers discriminated less among the reasoning strategies used. All reasoning strategies were rated as used "frequently." Two reasoning strategies received "high frequency" ratings: text-choice--generalization, which asked about selection of an answer which best fit the main idea of the question, and text-choice--elimination, which referred to the selection of the answer by process of elimination based on best fit with the question. The indications of the questionnaire results suggest that all of the reasoning strategies are involved in answer selection. Explicit or tacit reference to discourse and use of the question statement are essential elements for answer selection. The process of using discourse and question (choice) statements may vary in

form from process of elimination to generalization or even involve several strategies in the selection of one answer.

Within the frequency ratings of both reading and reasoning strategies the difference between grade levels was minimal. The frequency ratings for each question for each grade level varied only in the tenths of a point and seemed to fall in clusters, i.e., use of information about the story ranged from 4.20 for grade 4 to 3.79 for grade 6; the text-choice—generalization ratings range from 3.47 for 7th grade to 3.94 for 5th grade. The clusters were around a central rating such as "frequently" (3) and did not indicate a consistent pattern of difference among the grade levels, i.e., grade four sometimes used a strategy less than other grades, sometimes the same as other grades and sometimes more frequently.

The gifted readers responding to this questionnaire indicated a metacognitive awareness of the reading and reasoning strategies and their use in the comprehension process. There was little difference among grade levels in strategy awareness or use.

The results of the ITBS and the metacognition questionnaire provided traditional assessment of reading comprehension outcomes. The ITBS results established that the 100 students in this study were capable of scoring above chronological grade placement and that there is a significant difference between grades in successful response to question categories of fact, inference, and generalization. The significant difference between grades in correct responses to questions of fact, inference, and generalization indicated only that the number of

correct responses increased for each higher grade level. The significant difference did not indicate causality (Strang, 1962). The metacognition questionnaire results revealed an overall awareness of strategies and their use. These traditional measures basically established the following: the subjects of this study are gifted readers in terms of advanced reading comprehension and they are metacognitively aware of control and use of comprehension strategies.

Protocol Analysis

Five students from each grade level (4, 5, 6, 7) were selected for participation in the protocol analysis and interview situation. The selection of these students was based on ITBS Reading Comprehension subtest scores. Table 1 provides the results of the protocol analysis in terms of strategy use. The strategy is listed in the first column. Across the top are grade level designations. Within each cell is the number of times that strategy occurred by grade level.

An examination of Table 1 reveals an apparent nonuse of some strategies and frequent use of others. It is important to note, however, that some strategies were used by the student but not identified. As an example, the main idea and detail reference were not stated as used. However, for students to use the imagery strategy, reference to the main idea and the details was implicit. Since the strategy was only implicit within the use of another strategy and was not specifically identified, it was not counted.

Implications of protocol analysis results. The protocol analysis

TABLE 1

Protocol Analysis: Strategy Occurrence by Grade Level

Strategy	Grade Level Occurrences				
	4 (n = 5)	5 (n = 5)	6 (n = 5)	7 (n = 5)	Total (n = 20)
Reading Strategies					
Personal identification	1	4	3	1	9
Use of context	9	4	7	8	28
Synonym substitution	12	10	3	5	30
Stated failure to understand a word	11	6	8	7	32
Rereading	17	11	28	20	76
Inference	2	5	3	6	16
Addition of information	15	5	14	2	36
Hypothesis	7	10	2	2	21
Stated failure to understand a clause	4	3	2	6	15
Use of information about the story	7	4	4	0	15
Main idea and detail	not verbalized				
Imagery	26	8	12	10	56
Reasoning Strategies					
Text-discourse--key lexical item	5	6	6	8	25
Text-choice--key lexical item	4	3	4	4	11
T-D[a]--generalization	4	8	11	9	32
T-C[b]--generalization	0	1	0	0	1
T-D--elimination	22	24	20	16	82
T-C--elimination	33	19	14	16	82
Nontext-personal	3	1	4	4	12
T-D--dependent	not verbalized				
T-C--dependent	not verbalized				
T-D--factual	not verbalized				
T-C--factual	not verbalized				
T-D--inference	not verbalized				
T-C--inference	not verbalized				
T-C--semantic fit	not verbalized				

[a]Text-discourse

[b]Text-choice

procedure revealed many strategies are used by gifted readers in the comprehension process. The strategies may occur singularly as use of information about the story to understand new references. In most instances, however, the strategies were used in combination simultaneously or sequentially, i.e., rereading may involve use of information about the story and addition of information to understand the idea while at the same time using various strategies such as context and synonym substitution to obtain meaning of a word.

A new strategy was added to the reading strategy category: use of imagery. Students almost continuously referred to "seeing a picture" of what was being read. One reading strategy, main idea and detail, was not described by any student. Some reasoning strategies were not described and either may not have been used or were included as part of a larger strategy, i.e., text-choice--process of elimination was described but the elimination process may have involved text-choice--semantic fit, text-choice--key lexical item, text-discourse--factual. As a consequence, these strategies were not mentioned. The strategies identified during protocol analysis are defined based on use in the protocol analysis in Table 2.

In the protocol analysis section, the students described the reading process as they discussed what they were reading. Some of the descriptions involved more than one strategy. The following is an example:

Text read
Poem: "Belief"

"Fallen, a giant aspen blocked the spring.

TABLE 2

Reading and Reasoning Strategy Definitions

Reading Strategies: Three strategy groups. Strategies may occur singularly or be used simultaneously.

I. Word related strategies: pertains to word meaning within passage.
   context--use of context to define a word or use of contextual information to define a word.
   synonym substitution--use of a synonym in place of a word used in the text. Synonym substitution is used to check the meaning of a word in the text or to "translate" the text into a more meaningful statement for the reader.
   failure to understand a word--the subject states that the word is unkown. The use of other strategies may then follow to identify the word.

II. Context-related strategies: pertains to understanding statements or ideas as presented within the text.
   rereading--return to the text for reading again for one or several reasons: did not understand the first reading, need clarification, an idea needs reinforcement, etc.
   inference--interpretation of the text based on information within the text.
   failure to understand a clause--subject states an inability to understand a clause or sentence or paragraph. Other strategies such as rereading may then be applied.
   use of information about the story--information from the immediate text is related to the overall story or used to understand new information in the story.

III. Meaning-related strategies: employed when the subject is attempting to gain an understanding of a larger concept than the literal statement of text. These strategies usually require the interaction of several knowledge sources.
   personal identification--the subject relates what is in the context to personal experience(s) and usually elaborates the contextual statement in some way emotionally, visually, or informationally.
   addition of information--the subject adds personal knowledge to the information provided in the text. The addition usually elaborates the context and enriches comprehension.
   hypothesis/anticipation--subject predicts or indicates awareness of what will follow based on words in context, subject's own experience, and/or prior knowledge.
   imagery--subject visualizes the meaning of the text. This may involve addition of information, comparisons, etc. Imagery may be used for clarification or as a check for understanding.

Reasoning Strategies--Two strategy groups which may occur singularly or be used in combination as an answer is selected.

I. Text (discourse or choice) related strategies: strategies which primarily realy on information in the passage or in the question and answers for answer selection.
   text-choice--process of elimination--selection of an answer through contrast of answer choices with little reference to the text.
   text-discourse--process of elimination--selection of an answer through contrast of answer choices based on specific reference to or memory of text.
   text-discourse--generalization--answer selection based on general ideas stated in the text of the passage.
   text-choice--key lexical item--answer selection based on key words in the question as related to the answer choices.
   text-discourse--key lexical item--answer selection based on key words in the passage as related to answer choices.

II. Nontext related strategies: strategies which rely on information or knowledge possessed by the subject as an answer is selected.
   nontext personal--answer selection based on information known to the subject but not stated in the passage.
   text-choice--generalization--selection of an answer based on a general idea evoked within the subject by the question statement.

The water rose to form a pool, mirroring leaf-lace."

Protocol stated

"I didn't quite understand 'leaf-lace.' Then I went back and reread and kind of imagined what it would be like and I got an idea of what it would be" (rereading, imagery)

Other descriptions or protocols refer to use of the same strategy but phrase the description differently:

Text read

Poem: "Belief"

"Fallen, a giant aspen blocked the spring.
The water rose to form a pool, mirroring leaf-lace."

Protocol: Use of context

1. "It's confusing but I think that it means—it's very unclear to me—the 'spring' here, that gives me trouble because you don't know if you're talking about a spring of water or the season of spring. When I read this (rest of stanza) then I found out what 'spring' meant; it meant a stream of water."

2. "I still don't understand that ('spring'). Sometimes, when I don't understand, I'll go ahead and that will explain it."

Additional examples of the subjects' descriptions for strategies are included in Appendix A.

Reading and reasoning strategies were varied from what was established in previous research (Kavale & Schreiner, 1979; Olshavsky, 1976-77). Imagery was added to the reading strategies. The five reading strategies used most frequently during the protocol analysis procedure were rereading, imagery, addition of information, stated failure to understand a word, and synonym substitution. Only 7 of the 14 reasoning strategies emerged during protocol analysis:

text-discourse--elimination, text-choice--elimination, text-discourse--generalization, text-discourse--key lexical item, text-choice--key lexical item, nontext personal, and text-choice--generalization. It would appear that those reasoning strategies identified as used by the gifted readers included the other reasoning strategies not identified, i.e., text-choice--dependent is a general strategy that includes many of the other text-choice strategies.

There was a grade level difference in use for some strategies. Use of context, for example, was used nine times by fourth graders, four times by fifth graders, seven times by sixth graders, and eight times by seventh graders. However, use of context is a very common reading strategy emphasized often in basal reading series. Students in fourth grade have been explicitly instructed in the use of this strategy and find it easier to describe than those students in later grades. Fourth grade is a turning point in reading instruction (Durkin, 1981). The emphasis changes from reading skills to reading context. By fifth grade, behaviors such as use of context may be internalized and, consequently, not as available for discussion in protocol analysis sessions though the strategy is still used. The difference in instances of strategy use may not be related to actual use or to grade level but instead to internalization of the process with overt emphasis upon the content. The older student is still metacognitively aware of strategy availability, selection, and use, but this awareness is tacit rather than explicit. Just as fluent readers have internalized those special skills a beginning reader must acquire (Smith, 1971), it is hypothesized

that the gifted reader in this study has internalized some of the strategies employed in the comprehension process.

Interview

The interview was structured to further explore the questions of comprehension strategy use, metacognitive awareness, and grade level difference. The opportunity to ask specific questions about strategy use and awareness of reading process was enhanced by the verbal nature of the subjects. Each subject seemed quite pleased to be able to explain what she/he did while reading, why strategies were employed, and how selection of strategy use was performed.

To illustrate the interview results, one question and selected responses from each grade level are presented. The students were asked: "What comparisons do you make between your own experience and knowledge and the subject of the reading passage?" The following are representative responses to this question:

> 4th grade: "I can remember when it happened to me. It helps me to understand what is about more and like if something happens, it helps me to know what the character is going through in the book and makes it more interesting to read it."
>
> 5th grade: "It depends. If I'm reading about a 10-year-old like me, we have something in common. But, if it is about a 23-year-old, I'd only compare if we had the same problem."
>
> 6th grade: "If I'm reading about what I know about or have, I relate what I'm reading to what I know about—if they are the same or different. I compare the author's ideas."
>
> 7th grade: "Basically, I go back to the experience with the knowledge I may have and just compare similarities and differences and occasionally put myself in the character's place. It helps me to get a better understanding of the character."

Each student stated that comparisons were (a) selective based on the reader's experience; (b) made in terms of similarities and differences; (c) important in adding understanding and in making the text interesting. Each student demonstrated a metacognitive awareness. The strategy was assessed as to how appropriate it was to the type of text. The strategy was analyzed as to how it was used. Then the strategy was evaluated as to contributions made to the reading process. There was little grade level difference in discussion of the strategies and their use. Additional interview questions and selected responses are included in Appendix B.

The results of the interview confirmed the use of comprehension strategies and at the same time provided a rationale for use. For example, several students referred to the use of context and synonym substitution in order to obtain the meaning of an unknown word. The need to understand the word because of its contribution to meaning and the need to know it later were rationale offered as the strategy use was confirmed. Students suggested various forms of rereading from skimming to find an isolated word or fact to careful rereading of each sentence. Reasons offered were (a) coming across a reference to something earlier in the text that was not remembered, (b) realizing that what is read doesn't make sense because attention was not paid to earlier material, and (c) going back to look for information for clarification.

Imagery was mentioned frequently in the protocol analysis sessions and students, in the interviews, referred to use of imagery as helpful to understanding, as enjoyable by extending the words and making it

real, and as beneficial as the text comes to life and it is easier to relate to the text. The use of any of the reasoning strategies from text-discourse—generalization to text-choice—inference was based on the need to select "the most sensible answer."

The interview results also confirmed metacognitive awareness of strategy control and use. Students frequently described a sequence of strategy use in conjunction with evaluation of each strategy's effectiveness. A common response to questions about rereading involved (a) recognition of comprehension breakdown; (b) skim to find the point where the text was last understood; (c) skim through to pick up key words or main ideas; and (d) if skimming did not work (text still did not make sense), a careful rereading. Implementation of each of these strategies, the evaluation of effectiveness, and the implementation of new ones reflects the conscious exercise of control over the reading process especially when the student has no difficulty describing his/her reading behaviors.

There was little grade difference in the discussion of use of strategies or metacognitive awareness. Perhaps the questions evoked an awareness of strategies and their use for those students who might have internalized the reading process. Rather than grade level differences, individual differences surfaced. Two fourth graders scoring very close together on the ITBS responded quite differently to the questionnaire, the protocol analysis, and the interview. The first student indicated frequent use of various strategies on the questionnaire and fluently and openly discussed use of all the strategies during the interview. The

second student indicated on the questionnaire that he "never" came across an unknown word and that he "never" had to reread. During the interview, the second student confirmed the "never" rating for both unknown words and rereading. Yet, during the protocol analysis this same student questioned the meaning of "reclamation," then used context to define it. Though he was observed returning to the text for rereading several different times, he never indicated verbally that he was rereading. In terms of rereading strategy for the first student, he returned frequently for clarification and confirmation, identifying his behavior and providing his reasons. This difference is an indication not of difference in the reading process but in what assumptions and expectations the student has in terms of the reading process. Student number one had no difficulty explaining process whereas student number two seemed to feel he was expected to know all the words and remember everything he had read. Consequently, there appeared to be, based on interview responses, little difference in grade levels but some difference in attitudes and expectations related to the reading process.

The use of the protocol analysis procedure and the interview allowed the researcher to examine the reading comprehension process as it was being applied and to discuss and explore the individual's perspective of the process. These two procedures confirmed the use of specific reading comprehension strategies, indicated a metacognitive awareness on the part of the reader of available strategies, their use in reading comprehension and answer selection, and disconfirmed the

existence of much difference between grade levels in actual use of strategies.

The reading and reasoning strategies used during protocol analysis and discussed during the interview were not as extensive as the original list. Students did not indicate use of main idea and detail strategy or the more general reasoning strategies such as text-discourse--dependent, text-choice--dependent, or text-choice—factual. Results of these two components did, however, indicate that strategies may be used singularly or in some sequence or simultaneously depending upon the reading comprehension needs. The strategies were also common to all participants and were used in the same or very similar ways to accomplish comprehension.

Metacognitive awareness was common to the protocol analysis and interview participants. Students indicated awareness of strategies, why they were used, and if the specific strategy was or was not effective. These readers not only controlled the reading comprehension process but were aware of this control and its exercise.

These procedures indicated no real difference in strategy use or metacognition among grade levels. Students in the fourth grade verbalized the use of certain strategies more frequently than the other grades, yet in terms of actual use and discussion of strategies during the interview, there appeared to be no difference. This distinction in verbalization of strategies might be attributable to the internalization by the older students of the reading process.

Essentially, the protocol analysis and interview procedures

confirmed the use of comprehension strategies and provided insight into the reading process in terms of the reader's control over the process. Results indicated that gifted readers control their reading comprehension process, using strategies as appropriate and evaluating effectiveness in the achievement of reading comprehension.

Summary of the Findings

An analysis of the results of the component of this study, the ITBS, the metacognition questionnaire, the protocol analysis, and the interview, substantiated the view that a gifted reader controls the reading comprehension process, activating appropriate reading and reasoning strategies as necessary, and evaluating their effectiveness. The gifted reader has available specific identifiable reading and reasoning strategies which are exercised during the process of reading. The strategies which were used by the subjects in this study were:

Reading Strategies

1. Personal identification.
2. Use of content.
3. Synonym substitution.
4. Stated failure to understand a word.
5. Rereading.
6. Inference.
7. Addition of information.
8. Hypothesis.
9. Stated failure to understand a clause.
10. Use of information about the story.

Reasoning Strategies

1. Text-discourse--key lexical item.
2. Text-choice--key lexical item.
3. Text-discourse--generalization.
4. Text-choice--generalization.
5. Text-discourse--elimination.
6. Text-choice--elimination.
7. Nontext--personal.

The gifted reader is metacognitively aware of the reading process. This awareness allows the gifted reader to assess the comprehension process, select from available strategies, use the strategy, evaluate the effectiveness, select and implement other strategies if necessary, and again determine comprehension process.

The comprehension process and the extent of metacognition does not differ from grade to grade. Students in the fourth grade verbalized several strategies more frequently than the fifth grade. However, actual ability to use the strategies was not different. Several of the strategies such as use of context are actively taught in the primary grades, and the fourth grade students have not internalized these strategies as much as the older students.

There was a difference between grades in number of correct responses to multiple choice questions within the three categories of fact, inference, and generalization. There was a significant difference between the fourth grade and the fifth, sixth, and seventh grades in all three categories of questions with the fourth grade having fewer correct answers. There was also a significant difference between the fifth grade and the sixth and seventh grades in the categories of fact and generalization. In the category of inference, however, the fifth grade was significantly different only from the seventh grade. These results would indicate that the skills involved in responding to questions of fact, inference, and generalization are developed as the child progresses through the school curriculum, experiences tests, and, perhaps, is instructed in responding to different types of questions.

Gifted readers perform extremely well on reading comprehension tests. These students control their reading comprehension process by employing strategies appropriate to the comprehension problem and then evaluating the results. Two factors, comprehension strategies and metacognition, contribute to the advanced performance level on reading comprehension tests. By the control and exercise of these strategies, the gifted reader determines the comprehension outcomes.

Knowledge of the gifted reader's use of comprehension strategies and metacognitive awareness is directly transferable to any analysis of reading behavior. The reading behavior of a student can be analyzed in terms of those comprehension strategies employed and the extent of metacognitive awareness exercised in monitoring, controlling, and evaluating comprehension success. This application of knowledge contributes to the understanding of the comprehension process. Replication of this study with other groups of readers on the same grade levels will provide for comparison of strategy use and metacognitive awareness. If results of such a study indicate, methods for instruction in strategy use and procedures for development of metacognitive awareness would be appropriate.

Gifted readers share some common characteristics in the process of gaining comprehension. These characteristics involve the use of specific strategies and the exercise of control (metacognition) over the reading comprehension process. These characteristics are essentially and significantly involved in the reading comprehension process and contribute to the successful comprehension performance of the gifted reader.

APPENDIX A

Protocol Analysis: Examples of Strategy Use

Strategy	Text	Protocol
Reading Strategies		
1. use of context	"Currently in the United States, we are faced with a serious additional problem: the supply of minerals is dwindling . . ."	"I had to skim back over the second one because it wasn't a full sentence and I was trying to pick up what I was reading and there was a word in there I didn't understand and I went back and reread the words that were around it and then I understood it" (dwindling).
2. synonym substitution	"Currently in the United States, we are faced with a serious additional problem"	"I used 'another' for 'additional.' It's like when you are talking, say you're using the word 'additional.' It's easier to change it to another word more people are familiar with like 'more.' I do this when I'm reading. It's easier to relate to. It cleans up my thinking process by not jamming it up with all those other words."
3. stated failure to understand a word	"Such reclamation can be stepped up still further."	"I don't know what 'reclamation' means. I usually look it up in a dictionary or try to get it out of the sentence."
4. rereading	"One study estimates that 3 million metric tons of aluminum, zinc, copper, lead, and tin are contained in the 34 million metric tons of trash. . . "	"I'm going back because that's a long sentence and I needed more time to understand it. There were more facts in it and I thought it was pretty important. It seemed to say a lot of things in it and I wanted to make sure of what it was trying to tell me."
5. inference	"Look! Look! And there was only water sheen"	"I think he saw an illusion because the water was shiny."
6. use of information about the story	"One study estimates that 3 million metric tons of aluminum, zinc . . ."	"I can imagine 34 million, 3 million metric tons of this stuff but it's kind of hard. I used the other information in the story to understand that sentence."
7. personal identification	"Four is to recycle scrap and waste materials."	"I've been involved in recycling a lot of scrap material because last year I was collecting aluminum cans. I can relate to it a little better seeing as how I've done some of it. It's easier to relate to because I know what is going on."

Strategy	Text	Protocol
8. addition of information	"Experts agree that there are four things we can do to prevent our mineral cupboard from becoming bare."	"That reminded me of the short story about Mother Hubbard and her cupboard because they mention the cupboard from becoming bare. Again, I reread and looked for key words. In this, I like to think when I read--think of different other things besides the sentence. It gives me a more general idea of what the sentence is telling me."
9. anticipation	"Experts agree that there are four things we can do . . ."	"It says there are four things we can do to keep minerals from disappearing, but you have to keep reading because you don't really know what they are."
10. imagery	"The water rose to form a pool, mirroring Leaf-lace"	"I really didn't understand the poem very well and I was trying to picture it and what it would be like: picture of a fallen tree and spring but sometimes the picture didn't come out right because, like here in the second stanza I was trying to picture roses forming a pool. Finally I got it the right way: 'the water rose to form a pool.'"

Reasoning Strategies

1. text-choice--elimination
   "I think it is number one because none of the others really fit. I read through the question and all the answers. I used process of elimination."
2. text-discourse--elimination
   "I had to go back to the passage. Then, I skimmed the answers and number one made the most sense."
3. text-discourse--key lexical item
   "I returned to the passage and there was the key word in one of the answers: 'four eyes' means two people."
4. nontext--personal
   "I picked the one that said 'one of quiet beauty' because as I read the poem, I could picture like a stream and a tree fallen into it, with trees around it and a little cottage with two children in front of it."
5. text-discourse--generalization
   "I take the main idea of the passage and then go through the answers to match with the main idea and use that one" (answer).
6. text-choice--generalization
   "I read through the answers one by one and eliminate the ones that don't fit the idea of the question very well."
7. combination of strategies: text-discourse, text-choice, key lexical item, elimination, etc.
   "I picked number four because of the paragraph on experts. I kind of figured they meant all our natural resources because they said 'mineral cupboard.' Other answers didn't fit so I kind of used the process of elimination. I read the question and the answers and went to the passage and then selected the answer."

APPENDIX B

Interview Questions and Typical Responses

READING STRATEGIES

1. When you encounter an unknown word, what do you do to obtain its meaning?

   "Most of the time I look at the surrounding words and see if I can get an idea from there, and if not, I see if there is another word that may fit in place of the other word I don't understand and if that does not work, I will, if I'm home, look it up in the dictionary. If I don't, I may let it be and see if I can find it later on." (Male, 7th grade)

2. When you realize you have not understood or don't remember, what do you do?

   "Usually first I'll skim it, go back, to see if it is important enough to go back over and read--if it contributed to the understanding of it. If it does, I'll go back and read it over. I know to reread because I won't notice it in my mind, but when I go to the next sentence it sometimes doesn't make sense or it refers to something and I know I've missed it. Sometimes I just realize after I read it that I just didn't really read it." (Female, 7th grade)

3. What are some of the ways you reread to gain an understanding of the passage? What do you do and what do you look for?

   "If I need to find a single sentence or bit of information, I'll go back to the passage and find it like the name of a baby kangaroo, I'll find the paragraph about kangaroos and skim until I find the answer and read a little before and a little bit after. If I need to find out about the whole thing, I'll go back and really dig into it." (Male, 5th grade)

4. What is the difference between skimming, scanning, and rereading?

   "For skim sometimes I look quickly, I just look at the sentence and go on. Sometimes I look slowly and carefully for key words, key sentences, main ideas, and words that fit the main idea. For rereading, I reread the whole sentence. I read everything slowly and carefully so I'll get a better understanding." (Male, 6th grade)

5. What comparisons do you make between your own experience and knowledge and the subject of the text?

   "Sometimes, like in the poem 'Belief,' I imagine I am in the park with my friend, we have done that before--we chase each other in the park and we go down by the river and there are places like they mentioned there. The comparison 'emphasizes' it more because you are more familiar with it." (Female, 5th grade)

6. What are some of the ways you predict (anticipate)?

   "I know what is going to happen next because of the information before it. My information helps too because if you know what the character is going through, you can usually pick out what is going to happen next." (Female, 4th grade)

READING STRATEGIES--continued

7. In what ways do you use what you know about a topic with the information in the text?

"It helps me a little bit because I know a little more about it, it informs me. What I know kind of joins what I am reading--it just adds on." (Female, 5th grade)

8. To what extent do you use imagery?

"Usually it is like I am there. I pretend like I am there but I am invisible like I'm just listening in. I enjoy the book; it doesn't matter the book. I use imagery in social studies talking about indians. I pretend I'm there and invisible. Then it helps me to understand what we are talking about more and I get a better grade." (Female, 4th grade)

REASONING STRATEGIES

1. Describe how you go about selecting an answer on a multiple choice test.

"I read the question and read all the answers and then I decide. I think about what I've read and then I can choose the answer. If you really think about what you read and the question, it sort of adds up." (Female, 5th grade)

"Before I read the answers, I read the question and then think what relates to that question. Then I think about the answer and then I read the answers. I match answers to my answer." (Female, 6th grade)

2. What are some of the ways you select answers on a multiple choice test?

"I use elimination. Well, sometimes you can tell if the answer is even related to the sense of the way they are asking the question. And, also, you know some answers aren't related and don't fit the question." (Female, 7th grade)

3. What is the difference in ways of selecting an answer.

"I read over all the answers and pick out the answer. Then what I know about the question and the passage will determine what I do to select an answer." (Female, 4th grade)

4. Do you frequently return to the reading passage or mostly rely on your memory?

"If the passage is pretty easy and short and I can remember it, I don't go back. If it is longer and a topic I haven't done before, I'll go back because on a test it's better to be safe than sorry." (Male, 7th grade)

5. Which is more important, the information in the passage or the statement of the question?

"The question itself and then the information in the passage cause you may not understand the question. But if you use the question more, then you can go back to the passage to find out what the question is really asking." (Female, 4th grade)

6. When selecting an answer by process of elimination, what information do you use?

"I use how they phrase the answers and how it has to do with the question. And if it is getting down to the last two, I usually use how they word it (answer) and if I could change the question into an answer and maybe fit it with one of the two answers." (Female, 7th grade)

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